

Serial No.: 10/519,242
Filed: December 22, 2004

Remarks

The Examiner has rejected claims 1-6 under 35 USC 102(b) as anticipated by or, in the alternative, under 35 USC 103(b) as obvious over Mineo et al (JP 08-044066-machine translated).

The applicants have amended claim 1 and added new claims 7-11, and also have submitted a Declaration under 37 CFR Section 1.132.

The presently amended claim 1 refers to an anti-reflective coating composition which comprises a fluorine-containing polymer, an acid, an amine and an aqueous solvent capable of dissolving these components, further where the coating composition has a pH ranging from about 1.0 to about 6.0. Support for the amendment is present on page 7 of the present specification. The invention refers to a composition which, when mixed, are dissolved in an aqueous solution.

The Examiner has cited Mineo et al as disclosing a coating composition containing a water-soluble fluorine compound, water, ammonium salts, and alkyl carboxylic acid. The types of water-soluble fluorine compounds disclosed are either monomeric type of compounds as illustrated in section 0014 and 0018 of the patent application or specifically one Nafion type of polymer. The applicants have provided the Examiner with a Declaration under 37 CFR Section 1.132 which duplicates Example 1 of Mineo et al's application and also shows the lack of solubility of the Nafion polymer in an aqueous solution. The present applicants were able to show that the Nafion polymer when mixed with a mixture of

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heptadecanoic acid and tetramethyl ammonium hydroxide solution did not produce a clear solution, i.e. the components are not aqueous soluble. The photographs in the Declaration clearly show the presence of a precipitate when the Nafion polymer is mixed with water. That is, from Tests 1 and 2 of the Declaration, Nafion did not dissolve in the aqueous solution in a manner to be useful as an antireflective coating, since any particulate matter is extremely undesirable for the production of semiconductor devices. Nafion is the only fluorinated polymer exemplified in Mineo et al's application, and further since this example is inoperable, there is no teaching of the use a fluorinated polymer in an antireflective coating.

Furthermore, Mineo et al does not teach the requirement that the antireflective coating must be acidic and additionally that the pH of the antireflective coating solution be in the range of about 1.0 to about 6.0. In fact the inventive Example (section 0038) refers to a mixture of a 100% neutralized salt of heptadecafluorooctane sulfonic acid and tetramethyl ammonium hydroxide. This neutral salt solution is mixed with Nafion polymer and water. The only exemplified inventive example in the prior art does not disclose the pH of the coating solution; and, since the Nafion polymer is not soluble as shown in the Declaration and is added to a neutral solution, it is not inherent that the coating solution of the prior art would be acidic within the range of 1.0 and 6.0. Thus, there is no teaching in the prior art that an acidic coating solution between the pH of 1.0 to 6.0 is obtained or is necessary to the invention. The present application clearly shows Examples (Examples 5, 6 and Comparative Example 1) where if the pH is greater than about 6, then a rectangular pattern shape is not obtained, whereas where the pH is less than 6.0 then a rectangular pattern profile is

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obtained. Thus the prior art cited by the Examiner does not teach an antireflective coating composition comprising a fluorine-containing polymer, an acid, an amine and an aqueous solvent capable of dissolving these components, and further where the coating composition has a pH ranging from about 1.0 to about 6.0. Therefore, the Examiner is requested to remove this reference as prior art.

The Examiner has rejected claim 2 of the present invention because Mineo discloses a fluorinated alkyl polyether sulfonic acid (Nafion) and general formulas for polyether sulfonic acid and polyether carboxylic acid, thus making it is reasonable to arrive at the polymer described in claim 2 of the present application. However, as presented in the Declaration, the Nafion polymer forms a precipitate in water and is not an example of a water soluble polymer. Mineo et al refers to Nafion in Section 0039 of the prior art application as a water soluble polymer- "Nafion is the water-soluble fluorine compound of the following structures." Since Nafion is not operable, either as a water soluble polymer or as an antireflective coating of Example 1, one of skill in the art must assume that the other compounds of section 0014 are also not operable, since these compounds have not been exemplified. Thus, it would not be obvious to derive the fluorinated alkyl polyether carboxylic acid polymer of claim 2 of the present invention from the disclosure in Mineo et al. Therefore, the Examiner is requested to remove Mineo et al as a prior art reference.

The Examiner has rejected claim 3 as disclosing polyacrylic acid, [0013], line 3. However, Mineo teaches against the use of polyacrylic acid, specifically mentioning in [0013] line 4, that "poly vinyl alcohol and polyacrylic acid which are

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generally known, and polyvinylpyrrolidone are not enough as refractive index." Similarly polyacrylic acid is used as a comparative example. Thus, Mineo et al teaches against the use of polyacrylic acid.

The applicants have presented sufficient justification to remove Mineo et al as a reference against all the pending claims of the present application.

The Commissioner is authorized to credit any overpayment or charge any fee deficiency to Deposit Account No. 50-3309.

In view of the above changes and remarks, the present application is believed to be in condition for allowance, and reconsideration of it is requested. If the Examiner disagrees, he is requested to contact the agent for Applicants at the telephone number provided below.

Respectfully submitted,



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